

**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF WISCONSIN**

General Electric Company,

Plaintiff-Counter-Defendant,

Case No. 08-cv-298-bbc

v.

SonoSite, Inc.,

Defendant-Counter-Plaintiff.

**BRIEF IN SUPPORT OF PLAINTIFF'S MOTION FOR CONSTRUCTION
OF CLAIM TERMS OF U.S. PATENT NO. 5,722,412**

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Pursuant to the Court's June 12, 2008 Preliminary Pretrial Conference Order regarding claim construction and its September 26, 2008 Order amending the briefing schedule, General Electric Company ("GE") hereby respectfully submits this brief in support of its motion for construction of claim terms of U.S. Patent No. 5,722,412 ("the '412 patent").

I. INTRODUCTION

GE is the world's leading ultrasound company and has been providing premium, innovative ultrasound systems to physicians for decades to aid with the prevention, early detection and diagnosis, intervention and treatment of disease. Ultrasound systems are used in a variety of clinical specialties because they allow physicians to detect or examine a wide range of structures within the human body, including blood flow, the heart, abdominal and pelvic organs, muscles, tendons and other soft tissues. Many modern ultrasound systems are "console" systems that weigh several hundred pounds and are mounted on carts for portability. These larger systems have the advantage of offering nearly limitless features and functionalities.

Long ago industry leaders, including GE, recognized certain advantages of developing more compact ultrasound systems, including increased portability that could make ultrasound available in a greater variety of settings. However, then-available electronics required trade-offs between size and ultrasound features.

Technological advances in electronics, comparable to those that led to miniaturization of consumer electronics, have permitted development of ultrasound systems that are more compact and/or portable. With those advances the entire ultrasound industry moved to smaller ultrasound systems, ranging from relatively heavy console systems to smaller systems that are luggable and/or laptop-sized to systems that can be held in one hand to be operated. Consistent with that trend, GE began developing compact ultrasound systems years ago, and began selling the first of its compact systems in 2002. GE quickly became the market leader in compact systems,

overtaking its competitors in 2006. GE is continuing to create even more compact ultrasound systems and intends to launch a new product that will weigh less than ten pounds, provided that it is successful in obtaining a declaration of invalidity or non-infringement of the asserted claims of the '412 patent.

The '412 patent's purported novelty is not in inventive ultrasound techniques or image processing technology. Rather, the '412 patent is directed toward the general trend of reducing the size of ultrasound systems. Moreover, the '412 patentees do not purport to have invented the electronics that make a more compact system possible. Instead, the '412 patent merely packages conventional ultrasound components into "hand held" or "portable" systems using available electronics. It is not the first patent of its kind, as U.S. Patent No. 5,590,658 entitled "Portable Ultrasound Imaging System" predates the application date of the '412 patent and also discloses ultrasound systems that are significantly smaller than console systems. Indeed, portable and handheld ultrasound systems date back to the 1970s and 80s. *See* Declaration of Robert McAlhany, Jr. in Support of Plaintiff-Counter-Defendant's Motion for Construction of Claim Terms of U.S. Patent No. 5,722,412 ("McAlhany Decl."), Ex. 1 at 10, 14.

II. FACTUAL BACKGROUND

A. Overview of Ultrasound Technology

The basic components of an ultrasound system are a transducer and a beamformer.¹ The transducer emits a beam of sound waves and receives their reflected echoes. The beamformer

¹ This brief is supported by the Declaration of Mark Schafer, Ph.D. in Support of Plaintiff-Counter-Defendant's Motion for Construction of Claim Terms of U.S. Patent No. 5,722,412 ("Schafer Decl."). The technology description in this section and the following section of this brief is supported by and set forth in greater detail in that declaration.

delays and combines the received echo signals into “scanline signals” which can be processed into image data suitable for display.

The transducer, which is typically a handheld device, is placed on the patient at a desired location. The transducer emits a beam of high frequency pulses of sound into the patient’s tissue. As the sound pulse encounters target structures (*i.e.*, a mass, fetus, organ, muscle, etc.) along the beam path, sound waves reflect back to the transducer, creating an echo. The echoes from each target point along the beam path are received by a number of elements in the transducer. These echo signals are then sent to the beamformer.

The echo signals from a single target point arrive at the elements of the transducer at different times and thus are sent to the beamformer at different times. The beamformer delays the echo signals in such a way as to insure that all the signals corresponding to a single target point along the beam path can be added together (that is, “combined” or “summed”) into a single scanline signal corresponding to the echo for that target point. The beamformer delays and combines the echo signals corresponding to other points along the beam to create a complete scanline corresponding to the complete beam path.

Scanline signals are processed to create image data from which the ultrasound image will be created. Scanline signals may be processed in any number of ways, including being filtered, enhanced or otherwise modified to improve the quality of the data from which the ultrasound image will be created. Scanline signals along different beam angles are created and pieced together to form the two-dimensional signal data necessary to form the two-dimensional ultrasound display. The image data are then converted to a form which permits display of an image on a conventional display screen.

B. Beamformer Technology

In conventional early ultrasound systems the beamformer operated on analog signals. Analog signals are continuous signals of some physical variable, often voltage, which varies over time. In conventional analog ultrasound systems, as echo signals (*i.e.* sound waves) were continuously received by each transducer element, each of the transducer elements sent to the beamformer an analog signal that was a voltage that varied continuously over time. The size of the voltage transmitted to the beamformer varied in accordance with the echo signals received by the transducer element. As these analog signals were received by the beamformer, the beamformer delayed these analog signals using devices known as delay lines and then combined the delayed analog signals to create scanline signals. These scanline signals could then be processed as described above and used to create image data for display.

Improvements in electronics led to charged coupled devices (CCDs) which could sample analog signals at discrete time intervals. With the advent of CCDs, it became possible to create “sampled data” beamformers. A sampled data beamformer does not operate on an analog echo signal (which as noted above is a continuous signal); instead a sampled data beamformer samples the analog echo signal at discrete time intervals and operates only on these discrete samples.

In the case of a sampled data beamformer using CCDs, the echo signals received from the transducer elements are sampled by CCDs at discrete time intervals. Those discrete samples of echo signals are delayed by the CCDs and the delayed sampled echo signals are combined to create scanline signals that are then processed as described above to create ultrasound image data for display.

In the 1980s and 1990s, integrated circuits necessary for digital processing of signals became more and more sophisticated. As electronic systems converted to digital formats, ultrasound beamformers followed the trend, giving rise to a second kind of sampled data

beamformer – the digital sampled data beamformer. In a digital sampled data beamformer, the analog signal from the ultrasound transducer is sampled at discrete time intervals and converted to a digital signal. As described above, these digital signal samples are then delayed and combined to create scanline signals which are then processed to create ultrasound image data for display.

C. The ‘412 Patent and Its Prosecution

According to the ‘412 patent, prior ultrasound systems tended to be bulky and needed to be mounted on carts for portability. McAlhany Decl., Ex. 2 at col. 1:7-9. Prior to the electronics boom of the 1990s, introduction of advanced features typically made ultrasound systems bulkier. *Id.* at col. 1:10-18. However, as explained in the ‘412 patent, the increased availability of ever-smaller digital electronics would likely obviate this tradeoff between size and sophisticated features, and it would become feasible to create miniaturized ultrasound systems without sacrificing the sophisticated features of conventional large ultrasound systems. *Id.* at col. 1:19-30.

As claimed in the ‘412 patent when initially filed, the purported invention of the ‘412 patent resided in creating a more compact ultrasound system by incorporating into smaller housings a conventional ultrasound transducer and newly-available, more compact electronics of an ultrasound system. *Id.* at col. 2:39-46. The United States Patent Office rejected the ‘412 patent claims as filed, citing a prior United States patent to Chiang, describing a compact ultrasound system, and a prior United States patent to Shinomura, also describing a compact ultrasound system. McAlhany Decl., Ex. 3 (Feb. 24, 1997 Office Action) at 2-4.

In order to secure the ‘412 patent, the claims were narrowed to recite that the claimed ultrasound system used a “sampled data beamformer, which in a preferred embodiment is a digital beamformer.” *Id.*, Ex. 3 (Jun. 28, 1997 Response to Office Action) at 4. It was argued

that both Shinomura and Chiang must use a “conventional analog beamformer,” rather than a sampled data beamformer because the output of the Shinomura and Chiang beamformers was an “analog signal” that had to be digitized before being stored:

The Shinomura et al. device is unclear as to the nature of its beamformer but it appears, like Chiang et al., to be a conventional analog beamformer because the signals produced by the device must be A/D converted prior to being recorded or stored in the memory card 4A. . . . [T]here is no suggestion of a sampled data beamformer as recited in amended Claims 1 and 4.

Id. at 5.

III. PRINCIPLES OF CLAIM CONSTRUCTION

“It is a ‘bedrock principle’ of patent law that ‘the claims of the patent define the invention to which the patentee is entitled the right to exclude.’” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (citations omitted). The patentee is required to provide a written description in the specification “in such full, clear, concise, and exact terms as to enable any person skilled in the art . . . to make and use the same,” followed by “one or more claims particularly pointing out and distinctly claiming the subject matter which the application regards as his invention.” 35 U.S.C. § 112; *Phillips*, 415 F.3d at 1312. Because the patentee must define precisely his invention, it would be “unjust to the public, as well as an evasion of the law, to construe it in a manner different from the plain import of its terms.” *Id.* (citations omitted).

Claim construction is an issue of law to be decided by the Court. *Cybor Corp v. FAS Techs., Inc.*, 138 F.3d 1448, 1456 (Fed. Cir. 1998) (en banc); *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995) (en banc), *aff’d*, 517 U.S. 370 (1996). The Federal Circuit has explained that claim terms should generally be given their ordinary and customary meaning, which is the meaning that the term would have to a person of ordinary skill in the art at the time of the invention – *i.e.*, the effective date of the filing of the patent application. *Pfizer*,

Inc. v. Teva Pharms. USA, Inc., 429 F.3d 1364, 1372-73 (Fed. Cir. 2005); *Phillips*, 415 F.3d at 1313 (citations omitted).

Where the ordinary meaning of a claim term as understood by one skilled in the art is readily apparent even to lay persons, claim construction involves “little more than the application of the widely accepted meaning of commonly understood words.” *Id.* at 1314. However, where the meaning of the term as understood by one skilled in the art is not readily apparent, the court may look to the intrinsic evidence to determine the proper claim construction. *Id.* The language of the claims is of primary importance, but they do not stand alone. *Id.* at 1315. The skilled person is deemed to read the claims in the context of the entire patent, including the specification. *Id.*; *Nystrom v. Trex Co.*, 424 F.3d 1136, 1142 (Fed. Cir. 2005) (quoting *Markman*, 52 F.3d at 979) (“[T]he claim terms ‘must be read in view of the specification, of which they are a part.’”); *Multiform Desiccants, Inc. v. Medzam, Ltd.*, 133 F.3d 1473, 1478 (Fed. Cir. 1998) (“The best source for understanding a technical term is the specification from which it arose, informed, as needed, by the prosecution history.”); *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996) (“Usually, [the specification] is dispositive; it is the single best guide to the meaning of a disputed term.”). But though the specification is often instructive, the Federal Circuit has cautioned against importing limitations from the specification into the patent claims, particularly if the limitation is not consistent with how the skilled person would understand the claim terms. *See Phillips*, 415 F.3d at 1323.

The prosecution history is also important when construing claim terms. As the Federal Circuit explained, “[t]he prosecution history, which we have designated as part of the ‘intrinsic evidence,’ consists of the complete record of the proceedings before the PTO and includes the prior art cited during the examination of the patent.” *Id.* at 1317; *see also Kumar v. Ovonic*

Battery Co., Inc., 351 F.3d 1364, 1368 (Fed. Cir. 2003); *Tate Access Floors, Inc. v. Interface Architectural Res., Inc.*, 279 F.3d 1357, 1372 (Fed. Cir. 2002); *Vitronics*, 90 F.3d at 1582; *Markman*, 52 F.3d at 979-80. The prosecution history may demonstrate how the patent examiner and the inventor understood the invention and whether the inventor limited the invention during the course of prosecution. *Phillips*, 415 F.3d at 1317 (citations omitted).

Finally, courts may also rely on extrinsic evidence, which is all evidence that is external to the patent and prosecution history, for assistance in construing claim terms. *Id.* at 1317, 1318. The extrinsic evidence might include expert and inventor testimony, dictionaries, and learned treatises. *Id.* at 1317. Extrinsic evidence is generally afforded less weight, and should be “considered in the context of the intrinsic evidence.” *Id.* at 1319.

IV. THE TERMS OF THE ASSERTED ‘412 PATENT CLAIMS REQUIRING CONSTRUCTION

The claims at issue in this litigation are claims 11 to 14 and 16 to 18. Claim 11 is as follows:

A handheld ultrasound system comprising:

an array transducer; and

a sampled data beamformer for delaying and combining samples of echo signals received by elements of said array transducer,

wherein said array transducer and said beamformer are located in one or more enclosures weighing less than ten pounds (4.5 kilograms)

McAlhany Decl., Ex. 2 at col. 23:9-16. Claim 11 is the only independent claim. All of the other asserted claims are dependent and therefore include all of the above limitations, plus further limitations. *See id.* at col. 23:17-27, 23:32-40.

There are two phrases in claim 11 that are at issue on this motion:

a sampled data beamformer for delaying and combining samples of echo signals received by elements of said array transducer

and

wherein said array transducer and said beamformer are located in one or more enclosures weighing less than ten pounds (4.5 kilograms).

Id. at col. 23:11-16. Also at issue is the term “digital beamformer” which appears in claim 16:

The handheld ultrasound system of claim 11, wherein said beamformer is a digital beamformer which delays and combines digital echo signals.

Id. at col. 23:32-34.

As to the first of the phrases in claim 11, GE seeks a construction of “sampled data beamformer” that is consistent both with its understood meaning and the plain language of the claim. SonoSite agrees with GE’s proposed construction, but in addition asks the Court to improperly import into the claim another limitation about what the beamformer must output. That limitation is not supported by the plain claim language of claim 11, which addresses only what must be received by (*i.e.*, input into) the beamformer, and makes no reference to its output. Nor is SonoSite’s added limitation supported by the patent or its prosecution history. The issue with respect to claim 16 is the same as for the beamformer limitation in claim 11 – SonoSite is seeking to improperly import a limitation into the claim.

Construction of these beamformer terms is required because GE contends that the asserted claims are invalid over the prior art. Construction of what beamformers are covered by the claims will affect the extent to which some of that prior art is relevant (*e.g.*, whether a prior art reference can be cited as invalidating the patent under both 35 U.S.C Section 102 and Section 103, or only under one of them).

As to the second of the phrases in claim 11, GE seeks a ruling of invalidity on the ground of indefiniteness as the phrase is susceptible to numerous interpretations. Neither the patent nor its prosecution gives any guidance as to which is the correct interpretation, leaving the Court and those who wish to know the bounds of the claim to guess what the claim means. Because the

other asserted claims all depend from claim 11, a finding of indefiniteness as to claim 11 will compel a similar finding as to all of the asserted claims and will be dispositive of the entire case.

For the reasons set forth below, GE requests that the Court adopt GE's proposed construction of each of these disputed terms.

The parties agree that certain other claim terms in the asserted claims of the '412 patent also require construction. However, as to these other terms, the parties are in agreement as to their proper definition. These agreed definitions are set forth in the final section below. GE requests that the Court also adopt these agreed constructions.

V. CLAIM CONSTRUCTION OF DISPUTED TERMS OF THE '412 PATENT

GE and SonoSite do not agree on proposed constructions of the following claim terms.

GE respectfully requests that the Court adopt GE's proposed construction of these terms.

A. Claim 11: "a sampled data beamformer for delaying and combining samples of echo signals received by elements of said array transducer"

<i>GE's Proposed Claim Construction</i>	<i>SonoSite's Proposed Claim Construction</i>
"one or more components of an ultrasound system that delay and combine analog and/or digital samples of echo signals received by elements of said array transducer"	"one or more components of an ultrasound system that delay and combine analog and/or digital samples of echo signals received by elements of the array transducer and that output a digital signal"

The parties agree that the phrase "a sampled data beamformer for delaying and combining samples of echo signals received by elements of said array transducer" in claim 11 requires construction. The parties further agree that "a sampled data beamformer" is a beamformer that operates to delay and combine either digital or analog samples of echo signals received by elements of an array transducer. The parties disagree only as to whether the Court should add a limitation requiring that the output of a sampled data beamformer be a digital signal, as SonoSite contends, rather than merely construing the claim language, as GE contends.

1. The Plain Words of the Claim Support GE's Construction

To resolve the parties' dispute, the Court must look to "the ordinary and accustomed meaning of the words amongst artisans of ordinary skill in the relevant art at the time of the invention." *CollegeNet v. ApplyYourself, Inc.*, 418 F.3d 1225, 1231 (Fed. Cir. 2005) (citations omitted); *Vitronics*, 90 F.3d at 1582 (unless the intrinsic evidence compels a contrary result, a claim term should be given its ordinary and customary meaning). In this case, the plain meaning of the term "sampled data beamformer" to one skilled in the art is a beamformer that delays and combines either analog or digital samples of signals. Schafer Decl. ¶¶ 17, 21, 22, 25, 27, 29. To be a "sampled data beamformer," all that is required is that the signals operated on be samples of the echo signals (*i.e.*, the echo signals at discrete time intervals), not the analog signal (*i.e.*, the continuous signal) received from the transducer. There is no understanding by those skilled in the field that a sampled data beamformer must output only a digital signal as required by SonoSite's proposed construction.

Indeed, SonoSite itself previously agreed with GE's proposed construction and only recently has adopted this restrictive construction of the meaning of a sampled data beamformer. Recently, SonoSite litigated its '412 patent in *SonoSite, Inc. v. Zonare Medical Systems, Inc.*, Civ. Action No. 8:07-CV-00222-AG-FFM (C.D. Cal.) ("Zonare Litigation"). During the *Markman* proceedings in the Zonare Litigation, SonoSite agreed with GE's current construction and argued that "sampled data beamformer" should be construed merely as "a beamformer that operates on analog or digital samples of data."² McAlhany Decl., Ex. 4 at 18. Not surprisingly, SonoSite did not propose in the Zonare Litigation the additional limitation that a sampled data

² The Zonare Litigation was settled before the Court entered any rulings.

beamformer must output only digital signals because it knew then – and it knows now – that there is no common understanding by those skilled in the field of ultrasound that a sampled data beamformer must produce digital signals. Schafer Decl. ¶¶ 25-30, 31.

SonoSite’s construction lacks any support in the language of the claim. Claim 11 states, in part, “a sampled data beamformer for delaying and combining samples of echo signals received by elements of said array transducer.” McAlhany Decl., Ex. 2 at col. 23:11-13. Though this phrase describes the *input* into the sampled data beamformer (*i.e.*, “samples of echo signals received by elements of said array transducer”), and further describes the actions performed by the sampled data beamformer (*i.e.*, “delaying and combining”), nothing in this phrase references the *output* of the sampled data beamformer. Thus, the plain language of the phrase does not support SonoSite’s construction, and SonoSite is improperly adding a limitation to the claim’s plain terms.

2. The Specification Supports GE’s Construction

It is well-established that the words of a patent claim “must be read in view of the specification, of which they are a part,” but that limitations from the specification should not be imported into the claims. *Phillips*, 415 F.3d at 1315, 1323; *CollegeNet*, 418 F.3d at 1231. This rule is particularly applicable in this instance, where there is nothing in the specification that even arguably limits the term “sampled data beamformer” to only those that output digital signals.

There are circumstances in which a patentee is permitted to insist that the specification requires a construction that differs from a term’s ordinary meaning. Those circumstances arise only when the patent specification plainly reveals a special definition for a claim term that differs from the meaning that the term would otherwise possess, *Phillips*, 415 F.3d at 1316 (“the inventor’s lexicography governs”), or when the patentee “consistently and clearly use[s] a term

in a manner that is either more or less expansive than its general usage in the relevant community, and thus expand[s] or limit[s] the scope of the term in the context of the patent claims.” *CollegeNet*, 418 F.3d at 1231 (citations omitted); *Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1325 (Fed. Cir. 2002) (“The patentee may demonstrate an intent to deviate from the ordinary and accustomed meaning of a claim term by including in the specification expressions of manifest exclusion or restriction, representing a clear disavowal of claim scope.”).

In the present case, the patent not only does not expressly define “sampled data beamformer” to impart a special meaning to the phrase, but the ‘412 patent does not even include the term “sampled data beamformer” within the specification. *Compare Voda v. Cordis Corp.*, 536 F.3d 1311, 1320-21 (Fed. Cir. 2008) (the specification did not clearly limit “along a line” to instances where catheter was straight in its rest state because it also discussed the catheter without requiring that it be straight in its rest state); *Varco, L.P. v. Pason Sys. USA Corp.*, 436 F.3d 1368, 1373 (Fed. Cir. 2006) (claim term was not limited to manual operation where preamble used the term “automatic” and where specification did not limit operation to manual operation). Plainly, this is not an instance where the specification requires adoption of a special meaning for “sampled data beamformer.”

Perhaps SonoSite will argue that its proposed construction is supported by the description of embodiments of the purported invention in the ‘412 patent, where an analog-to-digital converter (“A/D converter”) is included to convert the analog signals from the transducer to digital signals prior to being sampled by the beamformer. McAlhany Decl., Ex. 2 at Fig. 1, col. 6:52. Unfortunately for SonoSite, any reliance on those embodiments would be misplaced for at least two reasons.

First, it is impermissible for a court to confine claims to the disclosed embodiments. *See Phillips*, 415 F.3d at 1323 (citations omitted) (“although the specification often describes very specific embodiments of the invention, we have repeatedly warned against confining the claims to those embodiments”); *Kapusta v. Gale Corp.*, No. 05-1091, 2005 U.S. App. LEXIS 24651, at *8 (Fed. Cir. Nov. 15, 2005) (claim term not limited to particular numerical dimensions because there was no indication in the specification that the embodiment in the figures or description including size limitations was meant to be the only embodiment).

Second, even in the disclosed embodiments, the specification does not require that the beamformer output only a digital signal. Instead, the output is merely described generically as scanline signals. *See McAlhany Decl.*, Ex. 2 at col. 7:11-13 (“The beamformed echo signals ... are produced as output scanline data”).

Accordingly, the specification supports GE’s proposed construction – the ordinary meaning of “sampled data beamformer” – and does not support the additional limitation that SonoSite proposes to import into the claim.

3. The Prosecution History Supports GE’s Construction

The prosecution history of a patent can sometimes support narrowing the meaning of a term. *See CollegeNet*, 418 F.3d at 1231 (citing *Boehringer Ingelheim Vetmedica, Inc. v. Schering-Plough Corp.*, 320 F.3d 1339, 1347 (Fed. Cir. 2003)) (“[A] patent applicant may use the words in the specification, prosecution history, or both ‘in a manner inconsistent with its ordinary meaning.’”) But, here again, as with the ‘412 patent specification, the ‘412 patent prosecution history contains no support for restricting the meaning of “sampled data beamformer” to only those sampled data beamformers that “output digital signals.”

Claim 11 of the ‘412 patent was amended to replace the term “beamformer” with “sampled data beamformer” in order to overcome prior art. *McAlhany Decl.*, Ex. 3 (Jun. 28,

1997 Response to Office Action) at 1-2. The amendment added the term “sampled data beamformer” to the claim and did not qualify it in any way. In a response to the February 24, 1997 Office Action, the patentees explained that the cited prior art Chiang patent “is directed to a scan head which includes a *beamformer producing an analog electrical signal* and an interface. As such, it is directed to a different invention than that of the present invention, which claims an array transducer with a *sampled data beamformer*, which in a preferred embodiment is a digital beamformer.” *Id.* at 4 (emphasis added). Notably, this argument simply states that the amended claims are directed to “a sampled data beamformer”; it does not state that the amended claims are directed to a special limited kind of sampled data beamformer that outputs only digital signals. Nor did the claim language that was added by the amendment contain any such limitation.

Plainly, this prosecution history argument was *not* intended to convey that the claims were being limited to some special limited type of sampled data beamformer. Rather it is apparent that by this statement the patentees were distinguishing their claimed *sampled data* beamformer from *conventional* beamformers, which delay and sum only analog signals (which as previously discussed are the continuous echo signals from the transducer), and accordingly produce an analog signal. Schafer Decl. ¶ 23.

This conclusion that the ‘412 patent claims were being distinguished from conventional beamformers which operate only on analog signals is confirmed by the following further argument made to distinguish the prior art:

The Shinomura et al. device is unclear as to the nature of its beamformer but it appears, like Chiang et al., to be a *conventional analog beamformer* because the signals produced by the device must be A/D converted prior to being recorded or stored in the memory card 4A. . . . [T]here is *no suggestion of a sampled data beamformer as recited in amended Claims 1 and 4.*

McAlhany Decl., Ex. 3 (Jun. 28, 1997 Response to Office Action) at 5 (emphasis added). Again, the distinction shown is between conventional beamformers and sampled data beamformers, not

between different types of sampled data beamformers. Significantly, this argument emphasizes that the beamformer covered by the claim is the one “recited in” the amended claims – and the amended claims recite only a sampled data beamformer – not a special sampled data beamformer.

Quite simply, the prosecution history supports only GE’s construction; it affords no support for SonoSite’s construction, which would improperly limit the claimed sampled data beamformers to those which “output a digital signal.”

4. Construction of this Phrase is Required for Purposes of GE’s Invalidity Defense

The Court has requested that the parties explain to what issues the disputed claim construction is relevant. In this case GE contends that the ‘412 patent is invalid over the prior art. Limiting the claim as SonoSite proposes could cause prior art disclosing sampled data beamformers in which the signals are not digitized when output from the beamformer to invalidate the claims only under 35 U.S.C. Section 103, rather than under both Section 103 and Section 102. Accordingly, this issue is central to the parties’ invalidity arguments regarding the claims.

SonoSite has no justification for its proposed claim construction requiring that the sampled data beamformer of claim 11 be one that will only “output a digital signal.” Accordingly, GE requests that the Court adopt its proposed construction that imports no extraneous limitations and indeed is consistent with SonoSite’s own proposed construction in prior litigation relating to the ‘412 patent.

B. Claim 16: “a digital beamformer which delays and combines digital echo signals”

<i>GE’s Proposed Claim Construction</i>	<i>SonoSite’s Proposed Claim Construction</i>
“one or more components of an ultrasound system that delay and combine digital echo signals received by elements of said array transducer”	“one or more components of an ultrasound system that delay and combine digital echo signals received by elements of said array transducer and that output a digital signal”

The parties’ disagreement over the construction of the phrase “a digital beamformer which delays and combines digital echo signals” in claim 16, which depends from claim 11, is identical to their dispute over the phrase “a sampled data beamformer for delaying and combining samples of echo signals received by elements of said array transducer” in claim 11. Accordingly, GE incorporates its discussed in Section A above.

The plain language of claim 16 refers to the *input* into the digital beamformer of digital echo signals, but does not discuss the beamformer’s *output* or limit it to digital signals. McAlhany Decl., Ex. 2 at col. 23:32-35.

Because the phrase “a digital beamformer which delays and combines digital echo signals” says nothing about the output of the beamformer, the construction should not include this added limitation. In the Zonare Litigation, SonoSite agreed with this construction, McAlhany Decl., Ex. 4 at 19 (“digital beamformer” should be construed as “a beamformer that operates on digital samples of data”), but now inexplicably has altered its position to add a limitation that is not supported by the plain words of the claim.

The specification of the ‘412 patent affords no support for SonoSite’s requirement that “digital beamformer” be limited to one that outputs digital signals. Though the patentees disclose a preferred embodiment with an A/D converter in the front end ASIC to convert analog signals to digital signals prior to beamforming, McAlhany Decl., Ex. 2 at Fig. 1, col. 6:52-55, the

specification does not require that the output of the “digital beamformer” be limited to digital signals. *Id.* at col. 7:11-13 (“The beamformed echo signals ... are produced as output scanline data”).

Like the phrase in claim 11 relating to the sampled data beamformer, the phrase “a digital beamformer which delays and combines digital echo signals” affects the relevance of GE’s cited prior art. As such, its construction is important to the issue of invalidity.

Because SonoSite is again importing an additional limitation into claim 16 by requiring that a “digital beamformer” output a digital signal, its claim construction should not be adopted. Accordingly, GE asks that the Court construe this term and that it adopt GE’s proposed claim construction.

C. Claim 11: “wherein said array transducer and said beamformer are located in one or more enclosures weighing less than ten pounds (4.5 kilograms)”

<i>GE’s Proposed Claim Construction</i>	<i>SonoSite’s Proposed Claim Construction</i>
This phrase is capable of multiple different constructions, but there is no guidance in the claim, specification or prosecution history as to what meaning the inventor intended for this phrase. Accordingly, this phrase is indefinite and fatally defective.	“wherein the array transducer and the beamformer are located in one or more enclosures, the enclosure(s) with the claimed ultrasound components weighing altogether less than 10 pounds (4.5 kilograms)”

The phrase “said array transducer and said beamformer are located in one or more enclosures weighing less than ten pounds (4.5 kilograms)” fails to precisely describe what must weigh less than ten pounds in order to infringe. Instead, it is hopelessly ambiguous.

One ambiguity in attempting to construe this phrase in claim 11 is whether the *enclosures themselves* (without any transducer or beamformer in them) must meet the less than 10 pound limitation or whether the *enclosures with their contents* must weigh less than ten pounds. If what must weigh less than ten pounds is the enclosure with its contents, is it *the enclosure with all of*

its contents that must weigh less than ten pounds or is it *the enclosure with only the part of its contents that constitute the beamformer and the transducer* that must weigh less than ten pounds? And there is the further ambiguity as to whether *only one of the several enclosures* must weigh less than ten pounds or whether *every one of the enclosures individually* must weigh less than ten pounds or whether *all of the enclosures collectively* must weigh less than ten pounds.

There is even ambiguity as to what enclosure(s) the claim is directed. The parties agree that the beamformer is “one or more components.” Is the enclosure a container for *a portion of those beamformer components* or is the enclosure a container for *all of the components of the beamformer*? Is the enclosure for the beamformer for purposes of claim 11 the *outermost casing* of the part of the ultrasound system in which the beamformer is located (for example, the casing for the ultrasound system console if that is where the beamformer is located) or could it be the *interior shield surrounding some or all of the beamformer components*?

Though SonoSite proposes one construction of this phrase, the numerous constructions posited above are equally feasible based upon the plain meaning of the phrase. Neither the specification nor the file history gives guidance as to which of the myriad options to choose. In these circumstances, the Court should find that the phrase is indefinite and, accordingly, find claim 11 invalid. Because all of the other asserted claims are dependent on claim 11 (and therefore incorporate this indefinite limitation), an indefiniteness finding as to claim 11 is dispositive of the entire case as the dependent claims must necessarily be found invalid for indefiniteness.

Indefiniteness is a matter of claim construction, and is therefore a question of law for the court’s determination. *Praxair, Inc. v. ATMI, Inc.*, Nos. 2007-1483, 2007-1509, 2008 U.S. App.

LEXIS 20437, at *30 (Fed. Cir. Sep. 29, 2008) (citing *Datamize, LLC v. Plumtree Software, Inc.*, 417 F.3d 1342, 1347 (Fed. Cir. 2005)). “[T]he same principles that generally govern claim construction are applicable to determining whether allegedly indefinite claim language is subject to construction.” *Praxair*, 2008 U.S. App. LEXIS 20437 at *30 (citing *Datamize*, 417 F.3d at 1348); *Young v. Lumenis, Inc.*, 492 F.3d 1336, 1346 (Fed. Cir. 2007) (“in the face of an allegation of indefiniteness, general principles of claim construction apply”). Thus, the court should consider primarily the claim language, the specification and the prosecution history. *Id.* (citing *Phillips*, 415 F.3d at 1314); *Datamize*, 417 F.3d at 1347. The court may rely upon extrinsic evidence, such as expert opinion, as well. *Id.*

In order to put the public on notice “of the patentee’s right to exclude,” the specification of every patent must “conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.” 35 U.S.C. § 112; *Praxair*, 2008 U.S. App. LEXIS 20437 at *30 (citing *Honeywell Int’l, Inc. v. Int’l Trade Comm’n*, 341 F.3d 1332, 1338 (Fed. Cir. 2003)); *see also* *Datamize*, 417 F.3d at 1347 (quoting *United Carbon Co. v. Binney & Smith Co.*, 317 U.S. 228, 236 (1942)) (“[t]he statutory requirement of particularity and distinctness in claims is met only when [the claims] clearly distinguish what is claimed from what went before in the art and clearly circumscribe what is foreclosed from future enterprise”). If one skilled in the art would understand the scope of the claim when read in conjunction with the specification, then the claim satisfies the definiteness requirements of section 112. *Praxair*, 2008 U.S. App. LEXIS 20437 at *31 (citing *Exxon Research & Eng’g Co. v. United States*, 265 F.3d 1371, 1375 (Fed. Cir. 2001)); *Young*, 492 F.3d at 1346 (indefiniteness requires a determination of whether those skilled in the art would understand what is claimed). Similarly, a claim is sufficiently clear to avoid invalidity on

indefiniteness grounds “[i]f the meaning of the claim is discernible, even though the task may be formidable and the conclusion may be one over which reasonable persons w[ould] disagree.” *Praxair*, 2008 U.S. App. LEXIS 20437 at *31 (citing *Exxon*, 265 F.3d at 1375). However, if the claim “is insolubly ambiguous, and no narrowing construction can properly be adopted,” it is indefinite and invalid. *Id.*; see also *Star Scientific, Inc. v. R.J. Reynolds Tobacco Co.*, 537 F.3d 1357, 1371 (Fed. Cir. 2008) (citing *Halliburton Energy Serv., Inc. v. M-I LLC*, 514 F.3d 1244, 1251 (Fed. Cir. 2008) (“If reasonable efforts at claim construction result in a definition that does not provide sufficient particularity and clarity to inform skilled artisans of the bounds of the claim, the claim is insolubly ambiguous and invalid for indefiniteness.”); *Datamize*, 417 F.3d at 1347 (citations omitted) (“Only claims ‘not amenable to construction’ or ‘insolubly ambiguous’ are indefinite.”).

The phrase “said array transducer and said beamformer are located in one or more enclosures weighing less than ten pounds (4.5 kilograms)” of claim 11 is insolubly ambiguous and not amenable to construction. As noted above, it is not clear to what enclosures the weight limitation applies. It is not clear whether the weight limitation applies to the empty enclosures or to the enclosures with their contents. It is not clear whether the weight limitation applies to the enclosures with their entire contents or to the enclosures containing only the transducer and beamformer and excluding their other contents. And it is not clear whether only one of the enclosures must weigh less than ten pounds, whether every one of the enclosures separately must weigh less than ten pounds, or whether all of the enclosures cumulatively must weigh less than ten pounds.

The intrinsic evidence on this point is not instructive. Although the ‘412 patent goes on for pages and pages with intricate details about the workings of the ultrasound system, apart from

the claims there are only three references to weight restrictions in the patent and none whatsoever in the file history to provide guidance to the Court – and to the public under section 112 – as to the scope of the claimed invention. The abstract of the ‘412 patent states:

“In a preferred embodiment an array transducer, digital beamformer, digital filter, and image processor are packaged in one or more enclosures weighing ten pounds (4.5 kilograms) or less.”

McAlhany Decl., Ex. 2, Abstract. This statement does nothing to resolve the ambiguities as it has all of the myriad constructions that are possible with the claim language itself.

Nor is any guidance as to construction provided in the specification of the ‘412 patent which refers to a preferred embodiment that “can be manufactured as a hand held unit weighing less than five pounds” and next discloses a two-unit ultrasound system with one section that contains “the transducer array, the electronics through to a video signal output, and the user controls” and is “approximately the same weight as a conventional ultrasound scanhead.” *Id.* at col. 1:59-61, col. 4:19-26. Neither disclosure contains the ten-pound limitation nor describes any enclosures containing a beamformer. Thus, the patent provides no guidance as to which of the many plausible constructions of the phrase “said array transducer and said beamformer are located in one or more enclosures weighing less than ten pounds (4.5 kilograms)” is correct.

This case is analogous to *Honeywell*, 341 F.3d 1332, *supra*. In that case the Federal Circuit found that there were three possible constructions of the phrase “melting point elevation” contained in the claims. *Id.* at 1339, 1340-42. Each involved a different method of measuring whether the limitation was met and the determination of infringement was different depending on which method was used. *Id.* at 1339. The Federal Circuit found the claim indefinite because nothing in the patent or its prosecution history clearly identified which of the methods was intended in the claims. *Id.* at 1340-42.

In the present case, as in *Honeywell*, there is nothing in the patent or its file history to clearly identify what should be weighed to determine infringement – which enclosures to select – whether to weigh them empty or with some or all of their contents – whether to weigh all of the enclosures or just one of the enclosures. Indeed the present case presents an even more egregious situation than in *Honeywell*, because in the present case, not only is it unclear what must be weighed, but it is also unclear whether the ten-pound limitation applies to the enclosures singly or collectively. With no direction in the claim or the specification, the public is left to guess the scope of the invention in claim 11 – without guidance as to which enclosures to weigh, what those enclosures may or may not contain and whether all together, each separately or only one of the one or more enclosures (and whether full or empty) must weigh less than ten pounds.

Such uncertainty in the claim language does not meet the requirements of section 112 that the claims clearly define what is infringing and what is not. *Morton Int’l, Inc. v. Cardinal Chem. Co.*, 5 F.3d 1464, 1470 (Fed. Cir. 1993) (the issue of indefiniteness turns on whether the claims at issue are sufficiently precise to permit a potential competitor to determine whether or not he is infringing). SonoSite’s proposed construction should be rejected and the phrase “said array transducer and said beamformer are located in one or more enclosures weighing less than ten pounds (4.5 kilograms)” should be found indefinite.

VI. CLAIM CONSTRUCTION OF AGREED-UPON TERMS OF THE ‘412 PATENT

GE and SonoSite agree that the following claim terms in the ‘412 patent should be construed and have agreed upon proposed constructions. Accordingly, the parties respectfully request that the Court adopt their joint proposed claim constructions.

A. Claims 12-14: “coupled to the output of”

<i>Joint Proposed Claim Construction</i>
“connected in such a way that information may be received from”

GE and SonoSite agree that the claim term “coupled to the output of” should be construed in order to clarify this technical term and avoid any ambiguity that may exist. The parties’ proposed construction is consistent with the plain language of the claims, and makes it clear that the coupling is a connection that results in directional data flow from the first component identified in the claim to the second component. Accordingly, GE respectfully requests that the Court adopt the parties’ joint proposed claim construction.

B. Claims 12, 13 and 17: “digital filter”

<i>Joint Proposed Claim Construction</i>
“one or more components of an ultrasound system that reduce, extract or enhance certain aspects of a digital signal”

The term “digital filter” is not defined in the asserted claims, nor is the term used in the specification of the ‘412 patent. To resolve any ambiguity over the meaning of this term, GE and SonoSite jointly propose that “digital filter” be construed as “one or more components that reduce, extract or enhance certain aspects of a digital signal.” This construction is consistent with the specification, which describes filtering of scanline signals within the digital signal processing ASIC. McAlhany Decl., Ex. 2 at col. 3:6-13 (“The digital signal processing ASIC filters the scanline signals and in the preferred embodiment also provides several advances features including synthetic aperture formation, frequency compounding, Doppler processing ...

and speckle reduction.”). Accordingly, GE respectfully requests the Court adopt the parties’ joint proposed construction of this claim term.

C. Claims 13, 14, 17 and 18: “image processor”

<i>Joint Proposed Claim Construction</i>
“one or more components of an ultrasound system that manipulate, enhance or otherwise modify image data”

The parties agree that the claim term “image processor” requires construction. The term is not defined in the asserted claims or elsewhere in the ‘412 patent, but those skilled in the art understand that an image processor manipulates, enhances or modifies image data (which is data that may be displayed as a 2-D or 3-D image after conversion to a suitable format) in preparation for display. *See, e.g.,* Schafer Decl. ¶ 15. GE respectfully requests that the Court adopt the parties’ joint proposed construction, which will clarify the meaning of this technical term.

D. Claim 18: “digital scan converter”

<i>Joint Proposed Claim Construction</i>
“one or more components of an ultrasound system that convert digital data into an image display format”

The parties agree that the term “digital scan converter” requires construction to avoid ambiguity as to the meaning of the term, which is not defined. The specification of the ‘412 patent refers repeatedly to “scan conversion” whereby data is converted to a format suitable for display (*e.g.,* data is converted from scanline signals to x, y coordinates for display on a screen), McAlhany Decl., Ex. 2 at col. 14:50-52, and the parties’ proposed construction is consistent with this description. Accordingly, GE respectfully requests that the Court adopt the parties’ joint proposed construction of this term.

VII. REQUEST FOR A CLAIM CONSTRUCTION HEARING

GE respectfully requests that the Court schedule a claim construction hearing for the following terms in claim 11:

a sampled data beamformer for delaying and combining samples of echo signals received by elements of said array transducer

and

wherein said array transducer and said beamformer are located in one or more enclosures weighing less than ten pounds (4.5 kilograms).

VIII. CONCLUSION

For the reasons stated above, GE respectfully requests that the Court adopt GE's claim constructions and reject SonoSite's contrary claim constructions for the '412 patent.

Respectfully submitted,

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CERTIFICATE OF SERVICE

A true and correct copy of the above and foregoing document was served on the following counsel as follows on October 24, 2008.

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